Wherefore, what is claimed is:

1. A computer-implemented process for correcting the color of improperly colored pixels of an image having multi-level red (R), green (G), and blue (B) color channels, comprising using a computer to perform the following process actions:

computing a histogram of the color levels of the image pixels for each of the color channels;

computing the lowermost and uppermost color levels for each of the color channels that are consistent with the overall distribution of color levels for that channel;

computing the per channel average color level for a group of the brightest pixels;

comparing the color levels of the G and R color channel pair and the G and B color channel pair to determine if the color levels in each compared pair is balanced; and

whenever the color levels of either compared color channel pair are determined not to be balanced, linearly expanding the dynamic range of the color channel with the narrower range to match the channel with the wider dynamic range to a desired degree for each of said channel pairs found to be out of balance.

2. The process of Claim 1, wherein the process action of computing the lowermost and uppermost color levels for each of the color channels that are consistent with the overall distribution of color levels for that channel, comprises, for each color channel in turn, the actions of:

computing the lowermost level as the level wherein,

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from the lowest level possible to the unknown lowermost level, less one level, is less than the total number of pixels in

the image multiplied by a tolerance factor designed to eliminate the impact of noise on the pixels color values, and

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from lowest level possible to the unknown lowermost level, is greater than or equal to the total number of pixels in the image multiplied by the tolerance factor; and

computing the uppermost level as the level wherein,

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from the unknown uppermost level to the highest level possible, is greater than or equal to the total number of pixels in the image multiplied by said tolerance factor, and

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from the unknown uppermost level, plus one level, to the highest level possible, is less than the total number of pixels in the image multiplied by the tolerance factor.

3. The process of Claim 1, wherein the process action of computing the per channel average color level for a group of the brightest pixels, comprises the actions of:

computing a histogram of the luminance (Y) channel of the pixels in the image;

computing the average color associated with each color level as a vector having an element for each color channel that represents the percentage of the number of pixels having that color channel exhibiting a particular Y intensity level as compared to all the pixels of any color channel exhibiting the Y intensity level under consideration;

computing the sum of the average color of a color level multiplied by the number of Y channel pixels associated with that level for each level within a particular range representing the group of the brightest pixels, divided by the sum of the number of Y channel pixels for each level within the same range, wherein the particular range is computed as being between the uppermost level

of the Y channel that is still consistent with the overall distribution of levels for that channel and the maximum level possible for that channel;

designating the resulting vector as the average color level vector for said group of the brightest pixels.

4. The process of Claim 3, wherein the process action of computing the particular level range representing the group of the brightest pixels as being between the uppermost level of the Y channel that is still consistent with the overall distribution of levels for that channel and the maximum level possible for that channel, comprises the actions of computing the uppermost level for the Y channel as the level wherein:

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from the unknown uppermost level, plus one level, to the highest level possible, is less than the total number of pixels in the image multiplied by a tolerance factor designed to eliminate the impact of noise on the pixels values; and

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from the unknown uppermost level to the highest level possible is greater than or equal to the total number of pixels in the image multiplied by the tolerance factor.

5. The process of Claim 1, wherein the process action of determining if the color levels of a compared color channel pair are balanced, comprises the actions of:

ascertaining if the dynamic color level ranges of the channel pair match within a prescribed tolerance; and

whenever the dynamic color level ranges of the channel pair do not match within the prescribed tolerance, designating the color levels of the color channel pair to be out of balance.

6. The process of Claim 5, wherein the process action of ascertaining if the dynamic color level ranges of the channel pair match within the prescribed tolerance, comprises the actions of:

determining if the difference between the average color level of the group of the brightest pixels for the channel pair under consideration is less than their average multiplied by a prescribed tolerance value;

determining if the difference between the lowermost color levels of color channel pair is less than their average multiplied by the prescribed tolerance value; and

whenever either of said differences is determined not to be less, designating that the dynamic color level ranges of the channel pair under consideration do not match within the prescribed tolerance.

7. The process of Claim 1, wherein the process action of linearly expanding the dynamic range of the color channel with the narrower range to match the channel with the wider dynamic range to a desired degree, comprises an action of varying the degree to which the color channel with the narrower range is made to match the channel with the wider dynamic range between expanding the channel with the narrower range to match the full range of the channel with the wider range to no expansion at all, depending on the value of a safeness parameter.

8. The process of Claim 7, wherein the safeness parameter is prescribed.

9. The process of Claim 7, wherein the safeness parameter is user-specified.

10. The process of Claim 1, wherein the process action of linearly expanding the dynamic range of the color channel with the narrower range to

match the channel with the wider dynamic range to a desired degree, comprises the actions of:

computing new lowermost and uppermost levels for the channel with the wider dynamic color level range that reflect the degree to which it is desired for the channel with the narrower range to match the channel with the wider range, and

employing the new lowermost and uppermost levels of the channel with the wider dynamic color level range and the lowermost and uppermost levels of the channel with the narrower range to establish a linear color correction transform that maps each old color level to a new color level;

applying the linear color correction transform to the color channel with the narrower range for each pixel of the image.

11. The process of Claim 10, wherein the process action of linearly expanding the dynamic range of the color channel with the narrower range to match the channel with the wider dynamic range to a desired degree, comprises an action of varying the degree to which the color channel with the narrower range is made to match the channel with the wider dynamic range between expanding the channel with the narrower range to match the full range of the channel with the wider range to no expansion at all, depending on the value of a safeness parameter, and wherein the process action of computing new lowermost and uppermost levels for the channel with the wider dynamic color level range that reflect the degree to which it is desired for the channel with the narrower range to match the channel with the wider range, comprises the actions of:

computing the new lowermost color level for the channel with the wider dynamic color level range as $\hat{B}_{wider} = (1-\alpha) B_{wider}$, wherein B_{wider} is the originally computed lowermost color level of the channel with the wider range, $\hat{B}_{wider}$ is the new lowermost color level of the channel with the wider range and α is the safeness parameter which varies from 0 to 1; and

computing the new uppermost color level for the channel with the wider dynamic color level range as $\hat{T}_{wider} = \alpha(L-1) + (1-\alpha)T_{wider}$, wherein T_{wider} is the originally computed uppermost color level of the channel with the wider range, $\hat{T}_{wider}$ is the new uppermost color level of the channel with the wider range and L is the maximum possible intensity level.

12. The process of Claim 11, wherein the process action of employing the lowermost and uppermost levels of the channel with the narrower dynamic color level range and the new lowermost and uppermost levels of the channel with the wider range to establish a linear color correction transform, comprises an action of establish the linear color correction transform as $\hat{I} = aI + b$, where, I is the original pixel color level, $\hat{I}$ is the linearly corrected pixel color level, $a = \left(\hat{T}_{wider} - \hat{B}_{wider}\right)/\left(T_{narrower} - B_{narrower}\right)$, $b = \left(\hat{B}_{wider}T_{narrower} - \hat{T}_{wider}B_{narrower}\right)/\left(T_{narrower} - B_{narrower}\right)$, $B_{narrower}$ is the originally computed lowermost color level of the channel with the narrower range, and $T_{narrower}$ is the originally computed uppermost color level of the channel with the narrower range.

13. A system for improving the appearance of an image having multi-level red (R), green (G), and blue (B) color channels, comprising:

a general purpose computing device;

a computer program comprising program modules executable by the computing device, wherein the computing device is directed by the program modules of the computer program to,

compute a histogram of the color levels of the image pixels for each of the color channels;

compute the lowermost and uppermost color levels for each of the color channels that are consistent with the overall distribution of color levels for that channel;

compute the per channel average color level for a group of the brightest pixels;

compare the color levels of the G and R color channel pair and the G and B color channel pair to determine if the color levels in each compared pair are balanced; and

whenever the color levels of either compared color channel pair are determined not to be balanced, linearly expand the dynamic range of the color channel with the narrower range to match the channel with the wider dynamic range to a desired degree for each of said channel pairs found to be out of balance, to improve the color of improperly colored pixels of the image.

14. A system of Claim 13, further comprising program modules for:

linearly expanding the dynamic range of the intensity levels of the image pixels so as to match the full dynamic intensity range available to a desired degree;

determining whether the linearly expanded intensity levels of the image pixels are evenly distributed; and

whenever the linearly expanded intensity levels of the pixels are determined not to be evenly distributed, applying a gamma correction factor to the linearly expanded intensity level of each pixel in the image to produce a corrected intensity value for each pixel and thereby improve the exposure of improperly exposed pixels of the image.

15. The system of Claim 14, wherein the program module for linearly expanding the dynamic range of the intensity levels of the image pixels so as to match the full dynamic intensity range available to a desired degree, comprises a sub-module for varying the degree to which intensity levels of the image pixels are made to match the full dynamic intensity range available between expanding the dynamic range of the intensity levels to match the full dynamic intensity range available to no expansion at all, depending on the value of an exposure safeness parameter.

16. The system of Claim 15, wherein the exposure safeness parameter is prescribed.

17. The system of Claim 15, wherein the exposure safeness parameter is user-specified.

18. The system of Claim 14, wherein the program module for linearly expanding the dynamic range of the intensity levels of the image pixels, comprises sub-module for:

computing a histogram of the intensity levels of the image pixels;

computing the lowermost and uppermost intensity levels that are consistent with the overall distribution of intensity levels in the image;

computing new lowermost and uppermost intensity levels that span the full dynamic intensity range available to a desired degree, and

employing the originally computed lowermost and uppermost intensity levels and the new lowermost and uppermost intensity levels to establish a linear intensity correction transform that maps the original intensity level of each pixel in the image to a linearly expanded intensity level;

applying the linear intensity correction transform to each pixel of the image.

19. The system of Claim 14, further comprising a process action of, whenever the application of a gamma correction factor to the linearly expanded intensity level of each pixel in the image results in an overall brightening of the image, boosting the color saturation levels of each color channel of each pixel of the image by a desired amount.

20. The system of Claim 19, wherein the sub-module for boosting the color saturation levels of each color channel of each pixel of the image by a desired amount, comprises a sub-module for varying the degree to which the

color saturation levels of the image pixels are boosted between about 25 percent to less than 1 percent, in proportion to the degree of brightening.

21. The system of Claim 13, wherein the program module for linearly expanding the dynamic range of the color channel with the narrower range to match the channel with the wider dynamic range to a desired degree, comprises an action of varying the degree to which the color channel with the narrower range is made to match the channel with the wider dynamic range between expanding the channel with the narrower range to match the full range of the channel with the wider range to no expansion at all, depending on the value of a color safeness parameter.

22. The process of Claim 21, wherein the color safeness parameter is prescribed.

23. The process of Claim 21, wherein the color safeness parameter is user-specified.

24. A computer-readable medium having computer-executable instructions for correcting the color of improperly colored pixels of an image having multi-level primary color channels, said computer-executable instructions comprising:

computing a histogram of the color levels of the image pixels for each of the color channels;

computing the lowermost and uppermost color levels for each of the color channels that are consistent with the overall distribution of color levels for that channel;

computing the per channel average color level for a group of the brightest pixels;

comparing the color levels of pairs of the color channels to determine if the color levels in each compared pair are balanced; and

whenever the color levels of a compared color channel pair are determined not to be balanced, linearly expanding the dynamic range of the color channel with the narrower range to match the channel with the wider dynamic range to a desired degree for each of said channel pairs found to be out of balance.